

## **REMARKS**

Applicant requests reconsideration of the final Office Action mailed November 27, 2009 in view of the following amendments and remarks.

The final Office Action rejects claims 1, 4, 6 and 7 under 35 USC §103(a) as unpatentable over Eshita in view of US Patent No. 5,633,715 to Ai, et al. (Ai), rejects claims 1 and 4-7 under 35 USC §103(a) as unpatentable over applicant's admitted prior art (AAPA) in view of Eshita and further in view of Ai, rejects claims 1, 4, 6 and 7 under 35 USC §112, second paragraph, as indefinite and objects to claim 7.

Applicant has amended claim 7 as suggested by the Examiner in response to the objection to claim 7, and respectfully request withdrawal of the objection, therefore.

In response to the rejection of claims 1 and 4-7 under 35 USC §112, second paragraph, as indefinite, applicant respectfully asserts that "K" is an integer in an integer range of 1 to "n," where "n" represents the highest integer value in said integer range and that "A(K)" is a function of K that is the amplitude of the K<sup>th</sup> half-wave, after the threshold (trigger time) is exceeded.  $T_s$  is the chronological focal point of envelope curve 6.

Applicant therefore concludes that the skilled artisan would understand that the equation is clear and definite under 35 USC §112, second paragraph, and that those of skill in the art would understand from the equation that  $T_s$  is a summation of "n" calculations of the equation's argument, taken at each consecutive integer value  $K=1, \dots K=n$ , and respectfully requests withdrawal of

the rejection of claims 1 and 4-7 under 35 USC §112, second paragraph, therefore.

Eshita and Ai at par. 5 of final Office Action

In response to the rejection of claims 1, 4, 6 and 7 under section 103(a) over Eshita in view of Ai, applicant respectfully asserts that the invention as claimed is patentable thereover for at least the following reasons.

With respect to the assertion that Eshita discloses a receiver unit that determines a time of a value characteristic of the ultrasonic signal at paragraph [0026], lines 1-16, applicant respectfully disagrees.

Eshita's paragraph [0026] discloses that, after square wave (K) is counted, there is a wait or count of three more waves rising before the received signal is acknowledged. Applicant does not find that Eshita determines a time **(t<sub>1</sub>) of a characteristic value**, as claimed (emphasis added). Put another way, Eshita's operation of detecting the zero crossings is not equivalent to determining a time t<sub>1</sub> of the maximum amplitude as a reference point, as claimed.

Nor does applicant find that Eshita at paragraph [0032] discloses using a time shift ( $\Delta t$ ) of the time **(t<sub>1</sub>) of the characteristic value** relative to the reception time (t<sub>0</sub>) to determine a correct time value for the reception time (t<sub>0</sub>). Eshita appears to subtract a "predetermined" time from the time of flight calculation, so this "subtracting 'predetermined' time received wave (W) reaching timing also considering the time of the event of the supersonic wave being first received" disclosed by Eshita at paragraph [0032] cannot be said to be equivalent to the

**receiver determining** a time shift ( $\Delta t$ ) of the time ( $t_1$ ) relative to the reception time ( $t_0$ ), as claimed (emphasis added).

While the Examiner asserts that Eshita fails to disclose that the receiver unit determines a chronological position of a focal point of the ultrasonic signal or its envelope as the characteristic value, that Ai teaches a centroid approach to estimate modulation peak in broad bandwidth interferometer with means for determining a chronological position of a focal point of a signal  $T_s$ , and that it would have been obvious to modify Eshita with the teachings of Ai, applicant further respectfully disagrees.

At col. 7, lines 10-24, Ai discloses determining a peak ( $z$ ) of bell-shaped curve  $f(z)$ , and makes clear that any error or shift ("z will differ from the abscissa of its peak") in the peak resulting from naturally occurring asymmetry in  $f(z)$  as the interferometry data are captured, is consistently repeated but only as long as the data remain substantially unchanged. Col. 3, line 55-col. 4, line 19, merely talks about problems in the art with repeatability of modulation-peak estimation.

Ai in essence states that while the data remains unchanged, the error is always consistently reflected "perfectly" in the relative measure. Ai not only suggests operating with error, Ai does not mention operation where data is inconsistent, that is, where there is fluctuating signal amplitude, the circumstances for which applicant's invention as claimed were meant to overcome.

So while the Examiner asserts that the skilled artisan would have looked to Ai to modify Eshita's receiver unit so the receiver unit could determine a

chronological position of a focal point or either the ultrasonic signal or its envelope curve as the characteristic value, as taught by Ai, applicant disagrees. Neither Eshita nor Ai suggest improving the measurement precision of an ultrasonic flow sensor in the event of sharply fluctuating signal amplitude.

Nor does Ai overcome the above-stated shortcomings of Eshita, so that even *assuming arguendo* that the skilled artisan would have considered combining Ai with Eshita, the combination of Ai with Eshita would still not realize the invention, as claimed.

But perhaps more importantly, incorporating the teachings of Ai could not be readily carried out without substantially modifying the operation of Eshita in view of the fact that Eshita's unit does not determine a chronological position of a focal point of either the ultrasonic signal or its envelope curve as the characteristic curve, the time of the characteristic value and time shift (as stated above). Eshita's detectors and internal processor, for example, the instructions control overall operation, would need to be modified, which is not a simple task.

While having to modify Eshita to incorporate the teachings of Ai does not in and of itself prevent a finding of obviousness, the proposed modification would render the Eshita unsatisfactory for its intended purpose (see In re Gordon, 221 USPQ 1125 (Fed. Cir. 1984)), and/or at least change Eshita's respective principles of operation (see In re Ratti, 123 USPQ 349 (CCPA 1959)), which in either case compels a legal conclusion that the proposed combinations cannot be obvious under the law; MPEP 2143.01.

Hence for all of these reasons, applicant respectfully asserts that claims 1, 4, 6 and 7 are not obvious under 35 USC §103(a) over Eshita in view of Ai, and requests withdrawal of the rejections.

AAPA, Eshita and Ai at par. 6 of final Office Action

To support the rejection of claims 1 and 4-7 over AAPA and Eshita in view of Ai, the Examiner asserts that the AAPA teaches determining reception time and a time value of the characteristic value of the ultrasound signal, but not correcting the reception time based on a time shift based on a time shift of a time of the characteristic value relative to the reception time.

The Examiner repeats the assertion that Eshita's paragraph [0026] discloses determining a time **( $t_1$ ) of a characteristic value**, and a time shift relative to the reception time and uses the time shift to determine a correct time value for the reception time, where the reception time is corrected as a function of the time shift at paragraph [0032] (emphasis added).

As stated above, applicant does not believe that Eshita discloses determining a time **( $t_1$ ) of a characteristic value** at paragraph [0026], as claimed (emphasis added). Nor does Eshita disclose discloses using a time shift ( $\Delta t$ ) of the time **( $t_1$ ) of the characteristic value** relative to the reception time ( $t_0$ ) to determine a correct time value for the reception time ( $t_0$ ), at paragraph [0032], as claimed (emphasis added).

As also stated above, incorporating the teachings of Ai into Eshita could not be carried out without substantially modifying Eshita because Eshita does not determine a chronological position of a focal point of either the ultrasonic signal or its envelope curve as the characteristic curve, the time of the characteristic value and time shift, and that such proposed modification would render the Eshita unsatisfactory for its intended purpose, and/or at least change Eshita's respective principles of operation.

Hence, it would not have been obvious to have modified AAPA in view of Eshita, and further modifying same with the teachings of Ai.

And in view of the shortcomings of Eshita, even assuming arguendo that the skilled artisan would have considered modifying AAPA by the teachings of Eshita and Ai, the proposed combination would still not realize a flow sensor that determines a time of a characteristic value of an ultrasound signal, a time shift of the time relative the reception time and uses the time shift to determine a correct time value of the reception time including determining a chronological position of a focal point of the ultrasonic signal or its envelope as the characteristic value, including the actual equation  $T_s$ , as claimed.

Hence for all of these reasons, applicant respectfully asserts that claims 1 and 4-7 are not obvious under 35 USC §103(a) over AAPA and Eshita in view of Ai, and requests withdrawal of the rejections.

Accordingly, the application is believed to be in condition for allowance. Action to this end is courteously solicited. However, should the Examiner have any further comments or suggestions, the undersigned would very much

welcome a telephone call in order to discuss appropriate claim language that will place the application in condition for allowance.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'Michael J. Striker', written over the printed name.

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